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Quality of Life Following Surgery for Vertebral Metastases From Breast Cancer

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Background and Objectives: The quality of life of patients with vertebral metastases from breast cancer treated with surgery was evaluated.
Methods: Seven such patients underwent surgery for vertebral metastases following chemoendocrine treatment. They presented with pain and some with neurological compromise.
Results: Following posterior stabilization with a segmental instrument, pain was alleviated in all seven women, two showed improvements in neurological compromise, and performance status was improved in five. In no patient was there neurological deterioration secondary to surgical intervention. They were out of bed on the 4th postoperative day and discharged on the 14th day on average.
Conclusions: The quality of life was improved for these surgically treated patients. We recommend surgical stabilization for selected patients with a vertebral metastasis from breast cancer.
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KEY WORDS: **breast cancer; vertebral metastases; surgical treatment; activity of daily life**

INTRODUCTION

Bone metastases was apparent in approximately 50%–74% of patients with breast cancer, as detected at autopsy [1], the spinal column was the most common site for this metastasis [2]. In patients with known spinal metastases, 20% or over may go on to have neurologic deficits [3]. Although epidural metastases produce cord compression with limited bone destruction and usually no loss of spinal stability, corporal metastases may cause significant bone destruction, resulting in spinal instability [4]. Finally, vertebral collapse causes extrusion of bone or soft tissues into the spinal canal followed by pain, paresis, paresthesia, and other symptoms.

Chemotherapy, hormonal therapy, and radiation therapy have proven effective in halting the osteolytic process and reversing the neurological compromise secondary to most epidural metastases. But these modalities cannot provide stability to a spinal column rendered unstable by the metastatic process and cannot be expected to relieve cord compression due to vertebral collapse [2]. As surgery can restore spinal canal support, nursing care is facilitated, neurological functions are restored, and pain can be controlled [5].

We report here our experience of surgical treatment for patients with vertebral metastases from a breast cancer, focusing on pain relief, restoration of neurological deficit, and performance status. The objective of this study was to determine if the operative procedure was justified in order to improve the quality of life for such patients.

MATERIALS AND METHODS

From January 1990 to August 1995, seven Japanese patients with vertebral metastases from breast cancer accompanied by secondary epidural compression under-

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TABLE I. Clinical Data on Seven Patients With Vertebral Metastases From Breast Cancer

Case	Age (years)	Gender	Initial surgery	ER/PgR[a]	Interval[b] (years)	Spinal levels	Concomitant bone disease	Visceral metastasis
1	52	F	Radical[c]	−/+	4	T7[d]		
2	43	F		+/+		C6[e]-T6	Sternum	
3	60	F		−/−		T4	Multifocal	Lung
4	53	F	Modified[f]	+/+	6	T8		
5	46	F	Radical	−/+	1.5	T12, L3	Right sternoclavicular joint	
6	55	F	Radical	−/−	6	C7, T1	Left femur	Left supraclavicular LN
7	62	F	Radical	−/−	1	C2, T1–3	Rib	Lung, mediastinal LN

[a]ER, sensitivity for estrogen receptor of original tumor; PgR, sensitivity for progesterone receptor of the original tumor.
[b]Postoperative intervals preceding surgical intervention to treat spinal disease.
[c]Standard radical mastectomy.
[d]Seventh thoracic vertebra.
[e]Sixth cervical vertebra.
[f]Modified radical mastectomy.

TABLE II. Treatment for Patients With Vertebral Metastases*

Case	Spinal levels	Palliative treatment	Surgical procedure
1	T7	CT, HT, SHT	Posterior decompression and stabilization by SSI
2	C6–T6	CT, HT, SHT	Posterior stabilization by SSI, anterior decompression and AIF
3	T4	CT, HT, SHT	Posterior stabilization by SSI
4	T8	CT, HT, SHT	Posterior decompression and stabilization by SSI
5	T12, L3	CT, HT, SHT	Posterior stabilization by SSI, anterior decompression and AIF
6	C7, T1	CT, HT	Posterior stabilization by SSI, anterior decompression and AIF
7	C2, T1–3	CT, HT	Posterior stabilization by SSI

*CT, chemotherapy; HT, hormone therapy; SHT, surgical hormone therapy (bilateral oophorectomy); SSI, segmental spinal instrumentation; AIF, anterior interbody fusion.

went surgery after chemoendocrine therapy, in Fukuoka City Hospital, Fukuoka, Japan. Surgical intervention was indicated mainly when (1) there is progressive spinal cord compromise by a tumor that is resistant to either radiotherapy or chemoendocrine therapy; (2) vertebral collapse and spinal instability with either intractable pain or neurologic dysfunction are present; and (3) patients were expected to survive longer than 3 months [2,5].

Preoperative radiation therapy was not given, because postoperative infections and wound dehiscences would likely have increased [6]. The selection of a surgical approach was predicated on the primary sites of osseous and neural involvement. The principle was that for multifocal metastases with three-column involvement, only posterior stabilization with a spinal instrument should be done, and that patients with a longer anticipated survival and/or with significant anterior compression were treated by posterior stabilization combined with anterior or posterior decompression.

The results of surgery were evaluated on the base of relief of pain, restoration of neurological deficits, and improvement of activity of daily life. Pain was classified according to the criteria proposed by Enneking [7]; neurological deficit was determined by the classification proposed by Frankel et al. [8]; and the Eastern Cooperative Oncology Group performance status (PS) scale [9] was applied to determine the level of activity.

RESULTS

Clinical findings are summarized in Table I. The seven women were 43 to 62 years (mean, 53 years) of age. Two patients (cases 2 and 3), who were diagnosed as cases of breast cancer with concomitant bone metastases at their visit to our hospital, were conservatively treated for the primary breast tumor. The remaining five had undergone modified or radical mastectomy for treatment of breast cancer prior to detection of vertebral metastases and were prescribed postoperative adjuvant therapy of 5-fluorouracil (5-FU) and the endocrinological agent, tamoxifen. All patients were also treated with combination chemotherapy with 5-FU, doxorubicine and cyclochosphamide before surgical intervention for the metastatic spine disease. Postoperative intervals preceding the second operation for spinal metastases were 1 to 6 years, the average being 3 years and 8 months. The thoracic spine was the most common site for metastatic deposits, which were present in all seven patients. Four patients (cases 2, 5, 6, and 7) had multiple levels of spinal involvement. Five patients (cases 2, 3, 5, 6, and 7) had a concomitant bone metastases to sites other than the spine.

Table II lists various treatments given to these patients. Palliative treatments such as chemotherapy, hormone therapy, and surgical hormone therapy (oophorectomy) were given to all patients prior to surgical intervention.

TABLE III. Comparison of Quality of Life Pre- and Postoperatively

Case	Grade of pain[a]		Neurological deficit[b]		Performance status[c]		Survival period after surgical intervention
	Preoperative	Postoperative	Preoperative	Postoperative	Preoperative	Postoperative	
1	II	I	A	B	4	3	Alive (70 months)
2	II	I	E	E	1	0	Dead (29 months)
3	II	I	E	E	1	1	Dead (27 months)
4	II	I	B	C	4	3	Dead (41 months)
5	II	I	E	E	1	0	Dead (15 months)
6	II	I	C	C	3	3	Dead (17 months)
7	II	I	E	E	2	1	Dead (3 months)

[a]Grade I: no pain and no medication; Grade II: mild or intermittent nondisabling pain and only anti-inflammatory or nonnarcotic analgesics intermittently prescribed; Grade III: moderate pain that is not continuous but is disabling when present and occasional or intermittent narcotic medication is needed; Grade IV: severe, continuous, disabling pain and continuous narcotic medication is needed.
[b]Grade A: complete motor and sensory loss; Grade B: complete motor and incomplete sensory loss; Grade C: some motor function and incomplete sensory loss; Grade D: useful motor function and incomplete sensory loss; Grade E: normal motor and sensory function.
[c]PS 0: fully active, able to carry on all predisease performance without restriction; PS 1: restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g., light housework, office work; PS 2: ambulatory and capable of all self-care but unable to carry out any work activities, up and about more than 50% of waking hours; PS 3: capable of only limited self-care, confined to bed or chair more than 50% of waking hours; PS 4: completely disabled, cannot carry on any self-care, totally confined to bed or chair.

Five patients underwent posterior stabilization combined with anterior or posterior decompression. For the other two patients, only posterior stabilization with a spinal instrument was performed.

Table III shows a comparison of the quality of life pre- and postoperatively. All patients presented with complaints of pain, and five had severe pain requiring narcotic analgesia. Pain was alleviated in all seven patients after the surgery. Three of seven patients presented with neurological compromise of at least Frankel grade C, and improvement after surgery was noted in two of three patients. As to PS, five patients were bedridden before surgery secondary to pain or paresis, but four were able to sit up and for one functional ambulation was feasible. For five patients PS was improved. Follow-up intervals of these patients ranged from 3 months to 5 years and 10 months. All patients survived longer than 3 months after the surgical intervention and two patients survived longer than 3 years after the surgical intervention. The patients were out of bed on an average 4 days after the surgery (range, 1–22 days) and out of hospital in 14 days (range, 5–37 days). No patient experienced neurologic deterioration secondary to surgical intervention and early death following surgery was nil. Deep-wound infection or instrumentation failure were also nil.

DISCUSSION

The spine is the most common site of skeletal metastasis, irrespective of the primary tumor, probably because of the involvement of the paravertebral venous plexus [10]. There is a general agreement that spinal cord compression from metastases primarily should be treated with steroids and radiation therapy, a recommendation based on several comparative studies of posterior decompression, with or without radiation, with radiation alone, and no advantage to the use of surgery was noted [11]. Some surgeons recommended posterior decompression as a procedure of choice to relieve anterior spinal cord compression, and many patients with spinal metastases can benefit from this type of surgical intervention [12,13]. In the current study, we directed attention to the functional outcome and the degree of recovery of quality of daily life in an attempt to estimate the effect of the surgical intervention for such patients.

Pain relief was achieved in all patients. In case of Frankel grades A and B, in which little or no motor function was maintained, neurologic deficits were alleviated in two of seven patients. Although overall improvement in neurologic deficits was not so promising, surgical intervention can lead to recovery in neurologic function. Improvement in levels of activity measured by PS was also achieved in five of seven patients.

The prognosis for patients with spinal metastasis is expected to improve with advances in adjuvant therapy. The morbid consequences of prolonged bed rest, paraplegia, and a painful, premature demise can be avoided if timely intervention is given due consideration [2]. The goal of surgical treatment of metastatic spine disease is to improve the quality of life, and reconstructive surgery can achieve this goal.

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